

Impact of Agricultural Programs on Youth Engagement in Agribusiness in Nigeria: A Case Study

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Abstract

Using the case of Fadama Graduate Unemployed Youth and Women Support (FGUYS) program, this study assessed the impact of agricultural programs on youth engagement in agribusiness in Nigeria. A total of 977 respondents comprising of 455 participants of the program and 522 non-participants were sampled across three states in Nigeria. Data were analysed using Descriptive and Endogenous Switching Probit Regression (ESPR) Model. The result showed that participation in the program was influenced by age, years of formal education, perception of agricultural programs and type of employment. Furthermore, the results showed a positive impact of the program on youths' likelihood to engage in agribusiness. The study recommends the need to invest more in agricultural programs such as the case study since it has desirable economic outcome for young people. Also, there is a need to improve the general outlook of agriculture such that it becomes more attractive to young people.

Keywords: youth, youth unemployment, agribusiness, agricultural programs

1. Introduction

Africa has long been known for its abundant natural and human resources. Unfortunately, more than half of these resources are barely sustainably utilized (Ali & Salisu, 2019). Efficient utilization of these two resources is closely linked. This is because efficient management of natural resources largely depends on the development and management of available human resources. However, the poor management of these two important resources has led to critical economic situations reflected in high rate of unemployment, underemployment, high crime rate, hunger and malnutrition in many African countries (Ali & Zulfiqar, 2018; Ebeke & Etoundi, 2017; Maldonado & Stanislaw, 2015) which calls for urgent policy action.

With a large proportion of African's human resources embedded in the younger generation which accounts for between 60-70 per cent of the entire population (African Economic Outlook Report, 2017; Awogbenle & Iwuamadi, 2010), youth unemployment has become a serious policy issue in many African countries including Nigeria. As reported by Trading Economics (2018), as at the third quarter of 2017, youth unemployment rate in Nigeria reached its highest record of 33.10 percent as opposed to 11.70 percent recorded in the fourth quarter of 2014, thereby averaging 21.73 per cent in the space of three years. Unfortunately, a further increase is expected in this rising trend if more job positions that young people can fill are not created (Adesugba & Mavrotas, 2016).

Adesugba and Mavrotas (2016) reported that even though, the proportion of unemployed youths in Nigeria have decreased in recent times following the implementation of a remarkable number of job creation programs targeted towards them, youth unemployment rate remains high which implies more effort should be directed towards the issue. At the center of all potential strategies to reduce youth unemployment stands the agricultural sector which continues to be the highest employer of labor in Nigeria and which also provides great prospect for job creation, particularly for young people (Ohene, 2013; Munishi, Mgelwa, & Guan, 2017; Nyabam, Tarawali, & Ijie, 2018). This is because majority of Nigerian youths stay in the rural areas (Allen et al., 2016) where the bulk of agricultural activities take place. It is believed that young engagement in agribusiness will not only help

to reduce unemployment among youths but, has great implication on poverty eradication, food security and economic development (Yami et al., 2019).

Based on this huge employment potentials embedded in the agricultural sector, there has been a growing commitment from the Nigerian government and development partners towards engaging youths in agribusiness (Awogbenle & Iwuamadi, 2010). These commitments are reflected in several programs which have been implemented over the years such as the Youth in Commercial Agriculture Development Program (YCAD), Youth Employment in Agriculture Program (YEAP), Youth Initiatives for Sustainable Agriculture (YISA) program, the Livelihood Improvement Family Enterprise (LIFE) program, and the Fadama Graduate Unemployed Youths and Women Support (FGUYS) Program.

However, while there is theoretical evidence of the existence of these initiatives, there is a dearth of empirical evidence on what worked well or what did not, making it difficult to inform evidence-based policy making and improvement of the implemented interventions. This implies that there is need to practically explore this research area for two important reasons. First is to provide evidence on the success or failure of these interventions in increasing youth engagement in agribusiness and secondly, to provide evidence which can help in improving the implementation of existing programs and design of future ones for effective youth engagement in agribusiness. Based on this, this study draws on evidence from the FGUYS program implemented in 2017 to assess the impact of agricultural programs on youth engagement in agribusiness in Nigeria.

2. The Intervention (FGUYS Program)

In an effort to reduce youth unemployment and empower young people through agribusiness, the FGUYS program was introduced in 2017 by the Federal Government of Nigeria, in collaboration with the World Bank and participating State Governments. The major objective was to expose unemployed youths to new agribusiness ideas so as to leverage their energy and motivation towards strengthening the drive for the national economy diversification and achieving food security (Federal Ministry of Agriculture and Rural Development, FMARD, 2018).

The program was conducted across twenty-three states in Nigeria including; Abia, Adamawa, Akwa Ibom, Anambra, Bauchi, Bayelsa, Benue, Ebonyi, Ekiti, FCT, Jigawa, Katsina, Kebbi, Kogi, Niger, Ogun, Ondo, Osun, Oyo, Plateau, Sokoto and Taraba States. Young people between 18 and 35 years old were trained in different agribusiness fields which include; Agricultural production (Crop and livestock), agricultural marketing, crop and livestock processing and financial management. Funding was through a tri-partite agreement between each participating State Government, the Federal Government and the World Bank.

3. Theoretical Framework

In this study, youth participation in agricultural program was modeled within the Theory of Utility Maximization framework. Youth's decision to participate/not to participate in the program is binary in nature. Under this framework, it is assumed that the decision maker is a rational economic agent and who, when faced with a set of alternatives, will choose the alternative that gives the best utility (Greene, 2003). Therefore, the decision to participate is made when the perceived utility from participation significantly outweighs the utility of choosing an alternative (not participating). Although, utility is directly unobservable, the actions of youths are observed through the choices they make.

Suppose that U_j and U_k denotes an individual's utility from two choices, which are respectively, represented by Y_j and Y_k . The linear random utility is expressed as:

$$U_{ij} = \beta_j X_j + \varepsilon_j \text{ and } U_{ik} = \beta_k X_k + \varepsilon_k \quad (1)$$

Where,

U_j and U_k denote the perceived utilities of participation and non-participation choices j and K ;

X_j and X_k denote the vectors of explanatory variables which affect the decision to participate/not to participate;

B_j and β_k are vectors of the parameter to be estimated;

ε_j and ε_k represent the error terms, which are assumed to be Independently and Identically Distributed (IID).

In the case of participation, if a youth chooses option j , it then follows that the perceived utility from option j is greater than that from the other option, say k as indicated in Equation 2.

$$U_{ij}(B_j X_i + \varepsilon_j) > U_{ik}(B_k X_i + \varepsilon_k), k \neq j \quad (2)$$

The probability that a youth will choose to participate is expressed as:

$$P(Y=1|X) = P(U_{ij} > U_{ik}) \quad (3)$$

$$= P(B'_j X_j + \varepsilon_j - B'_k X_i - \varepsilon_k > 0|X) \quad (4)$$

$$= P(B'_j X_i - B'_k X_i + \varepsilon_j - \varepsilon_k > 0|X)$$

$$= P(B^* X_i + \varepsilon^* > 0|X = F(B^* X_i)) \quad (5)$$

Where,

P is the probability function;

$\varepsilon^* = \varepsilon_j - \varepsilon_k$ is a random error term;

$F(B^* X_i)$ is the cumulative distribution function of ε^* estimated at $B^* X_i$;

$B^* = (B'_j - B'_k)$ is a vector of the net effect of the explanatory variables affecting youth decisions to participate in the FGUYS program.

4. Materials and Method

4.1 Study Areas

The survey was conducted in three States in Nigeria between January and February 2019. These include Abia, Ekiti and Kebbi States which represent the Eastern, Western and Northern regions respectively. These states were selected based on their similarities in terms of agricultural engagement (more than 70 per cent are engaged in agriculture) and to ensure the inclusion of the three regions covered by the program.

Abia state is located in the South-Eastern region with a population of 3.70 million (National Bureau of Statistics, 2011). The major economic activity of the people is farming which is carried out mainly at subsistence level (Christain Aid, 2017). Crop production features the cultivation of yams, maize, potatoes, rice, cashews, plantains, taro, and cassava (Hoiberg, 2010). The most important cash crop grown in the state is oil palm. Young people are majorly involved in Cassava processing for the production of starch and flour as well as vegetable and fruit canning (Christain Aid, 2017). The animals reared include poultry, sheep, goat, pig, cattle and most recently snail and grass-cutter. Fish farming is also practiced. Two seasons, rainy and dry, are experienced in the tropical climate of Abia State between April to October and November to March respectively. The rainfall ranges from 1500 to 2400 mm (Hoiberg, 2010) and the temperature is between 21 and 32 °C (Nwagbara & Ibe, 2015).

Ekiti state is located in the South-Western region with a population of 2.40 million (National Bureau of Statistics, 2011). Majority of the population (More than 70 percent) are engaged in agriculture with many practicing at subsistence level. The major crops produced in the state include; Cocoa, yam (81,000 ha), rice (120,000 ha), maize (159,000 ha), and cassava (87,000 ha). Tree crops include 8,500 mt palm kernel and 32,681 mt Cocoa (Ajayi, 2017). The animals reared include poultry, sheep, goat, pig, cattle, snail and grass-cutter. In addition, there are many fish farmers in the state. The climate pattern has two distinct seasons which are; the rainy season, between April and October and; the dry season between November and March, with an annual mean rainfall and temperature of 1400 mm and 27 °C respectively.

Kebbi state is located in the North-Western region with a population of 3.26 million (National Bureau of Statistics, 2011). The major economic activity of the people is agriculture. Crop production features the cultivation of rice, groundnuts, millet, sorghum, onions, vegetables and cowpeas. The animals reared include goat, poultry, sheep, and cattle. The State has two important agricultural lands which are: Fadama (floodplains) and dryland. These agricultural lands are the key source of income to millions of people in the State (Usman, Noma, & Kudiri 2016).

4.2 Sampling and Data Collection

The study adopted a multistage sampling technique. In the first stage, three states were purposively selected. The choice of these states was based on the relatively high number of participants (300 participants from each state) in the FGUYS program in 2017, to ensure representation of the three regions covered by the program, and similarities in their agricultural profile. The aim of this was to ensure that the respondents are comparable to allow analysis aggregation. In the second stage, the study population was divided into two strata: participants and non-participants. A sampling frame, comprising of the complete list of youths who participated in the program in 2017 across the three states (total of 900 youths) was used in gathering the participants while another sampling frame, consisting of lists of youths in the communities where the program was conducted was sought from the community leaders to gather the non-participants. The third stage involves the random selection of a

total of 977 youths from the two sampling frames, consisting of 455 participants of FGUYs program and 522 non-participants.

Primary data was used in this study. Specifically, quantitative data were collected on important variables which were classified into three categories including: Demographic Information, Training, and Agribusiness Characteristics. Data was also collected on Socio-Economic Characteristics such as age, gender, education and marital status. Data was collected using a semi-structured questionnaire which was designed based on previous studies. This was to ensure relevance of the solicited information in achieving the study objectives. Variables measured and means of measurement were programmed on Open Data Kit (ODK) and data were collected using Phones and Tablets by trained enumerators.

4.3 Empirical Model: Endogenous Switching Probit Regression Model

For this analysis, the dependent variable is dichotomous in nature which implies that using a probit/logit regression model may be appropriate. However, the major setback of using a binary outcome model in this case is that participation in the program may not necessary be random which may bring about possible selectivity bias. Thus, adopting a switching probit regression model which accounts for this selection bias is preferable to obtain better results. A number of studies have applied the same model for impact analysis (Aakvik, Heckman, & Vytlačil, 2000; Démurger & Li, 2013; Wossen et al., 2017; Issahaku & Abdul-Rahaman, 2019). Thus, to account for possible endogeneity problem, switching probit model was used to estimate the impact of the FGUYs program on youth agribusiness engagement.

Many studies have highlighted the advantage of using this model over other alternative models, such as Heckprobit and Biprobit, in terms of sample selection in the context of discrete outcomes (Démurger & Li, 2013; Aakvik et al., 2000). This includes efficiency and the relaxation of restrictive assumptions and commands which requires difficult adjustments to derive consistent standard errors (Lokshin & Sajaia, 2011). Another major advantage switch probit has over other models is that it yields consistent standard errors by implementing the full information maximum likelihood method which simultaneously estimate the selection and outcome equations of the model. In addition, the model helps to derive the ATT and ATE.

Following existing literature, the study considered the regime (T_i) which indicates whether a youth participated in the training program or not and an outcome variable (Y_i) which is also binary and measures if a youth is engaged in agribusiness or not. The model is specified as follows:

$$T_i = \begin{cases} 1, & \text{if } \alpha Z_i + \mu_i > 0 \\ 0, & \text{otherwise} \end{cases} \quad (6)$$

$$\text{Regime 1: } Y_{1i}^* = I[\beta_1 X_{1i} + \varepsilon_{1i} > 0] \quad (7)$$

$$\text{Regime 2: } Y_{0i}^* = I[\beta_0 X_{0i} + \varepsilon_{0i} > 0] \quad (8)$$

Where,

Y_{1i}^* and Y_{0i}^* are the latent variables for the observed binary outcomes Y_1 and Y_0 (engagement in agribusiness or otherwise);

X_{1i} and Z_{1i} are the covariates which influences engagement in agribusiness and participation in training respectively;

μ_i is the error term for the selection equation;

ε_{0i} and ε_{1i} are the outcome-specific error terms.

$I[.]$ is the indicator function. The error terms in both the selection and outcome equations are assumed to be jointly normally distributed with zero mean vector and covariance matrix¹²:

$$\Sigma = \begin{bmatrix} 1 & \rho\mu 1 & \rho\mu 0 \\ & 1 & \rho 0 1 \\ & & 1 \end{bmatrix}$$

Where,

$\rho\mu$ (0 and 1) represents the correlation between the unobserved characteristics which predicts participation in the program and that of the outcome variable;

$\rho 0 1$ is the correlation between ε_0 and ε_1 .

It should be noted that if the rhos (ρ) are statistically significant, it becomes necessary to account for endogeneity.

According to Aakvik et al. (2000), when identifying the switching regression model, it is expedient to use at least one additional variable as an instrument in the selection equation. This is to yield a more robust and efficient impact estimate. The instrument is however expected to influence participation decision, but not to affect agribusiness engagement decision (except through their influence on participation).

As earlier stated, participation in the program can be endogenous as participants and non-participants may share common unobserved characteristics which may affect participation. Thus, following literature (e.g., Abdulai & Huffman, 2014), this study used youth perception of agricultural training as an instrumental variable for the identification strategy. This is because this variable may influence the decision to participate in the program but, may not necessarily influence their decision to engage in agribusiness. Thus, data on this variable was collected from each respondent during the survey. The variables included in the model and their definition is presented in Table 1.

Table 1. Definition of variables

Variable	Description	Measurement
PARTICIPATION	Dependent variable indicating youth participation in the Fadama GUYS programme	Dummy (Participants = 1, Non-participants = 0)
AGE	Age of the youth	Age in years
EDUC	Education level of the youth	Years of formal education
GENDER	Gender of the youth	Dummy (Male = 1, Female = 0)
MARITAL_STAT	Marital Status of the Youth	Dummy (Married = 1, Otherwise = 0)
HHSIZE	Household size of where the youth comes from	Number of household members
MIGR_STAT	Migration status of the youths from their original place of birth/residence	Dummy (Migrated = 1, Not Migrated = 0)
ASTINDEX	Ownership of asset	Continuous index
TRAIN_PERC	Youth perception about agricultural programs	Dummy (Positive perception = 1, otherwise = 0)
JOB_SEARCH	Currently and actively searching for job	Dummy (Yes = 1, otherwise = 0)
EMP_TYPE	Type of Employment	Dummy (Formal = 1, otherwise = 0)
CREDIT	Access to credit facilities	Dummy (Have access to credit = 1, otherwise = 0)
MHI	Mental Health Index	Continuous index

5. Results and Discussion

The results are discussed under two broad sections. In the first section, a description of the Socioeconomic Characteristics of the sampled respondents comparing participants and non-participants is presented. The second section presents the econometric results on the impact of the FGUYS program on youths' decision to engage in agribusiness.

5.1 Description and Summary Statistics of the Explanatory Variables

Table 2 presents the t-test and chi-square comparison of means of selected variables for the participants and non-participants. Some of these variables are the explanatory variables of the estimated models presented in the second section.

Table 2. Description and summary statistics of the explanatory variables

Variable	Pooled (n = 977)	Treated (n = 455)	Control (n = 522)	z-value
Age of Respondents	25.72	27.33	24.33	-10.92***
Formal Education (Years)	14.10	14.48	13.77	-3.78***
Household Size	6.09	5.62	6.49	4.03***
Experience in Agriculture (Years)	2.07	2.13	1.95	-1.80*
Asset Index Score	4.50	4.68	4.35	-1.99**
Gender (Male = 1)	67.04	65.49	68.39	0.96
Marital status (Married = 1)	26.10	39.56	14.36	-8.94***
Access to Credit (Yes = 1)	23.23	25.67	20.44	-1.93**
Ownership of Agribusiness (Yes = 1)	47.49	62.20	34.67	-8.59***
Type of Employment (Formal = 1)	9.11	7.47	10.53	-1.66*

Note. $p > 0.1 = *$, $p > 0.05 = **$, $p > 0.01 = ***$.

Source: Author's Computation, 2019.

The dataset contains a total of 977 respondents in which about 47 percent were participants. Participants had a mean age of 27 years while non-participants had a mean of 24 years. The difference between the mean age for the two groups was significant at 1 per cent. About Sixty-five per cent of the participants were male against sixty-eight per cent of the non-participants. The difference between the two groups when disaggregated by gender was not statistically significant. About 40 per cent of the participants were married compared to only 14 per cent of the non-participants. The difference between the two groups was statistically significant at 1 per cent.

The average years of formal education was close to 15 years for participants compared to 13 years for non-participants. This high literacy rate among both groups could be attributed to the high value placed on education in Nigeria. According to FAO (2018), the youth literacy rate in Nigeria has been rising since 1991, it grew from 66.4 per cent in 2008 to 79.9 per cent in 2015. The two mean were significantly and statistically different at 1 per cent.

Averagely, participants had a household size of about 5 persons while non-participants had an average of 6 persons. The average household size was defined in terms of the average number of people who lives and dines under the same roof as the participant. This result corroborates the result of Alfred (2014) who found that the mean household size in Nigeria is between 4 and 6 persons. However, the mean household size of non-participants was slightly higher than the number reported by the General Household Survey (GHS) in 2017 which indicated that the average household size in Nigeria is 5. Thus, it can be inferred that the majority of the non-participants were from large households. The difference between the household sizes for the two groups was significant at less than 1 per cent.

The mean year of experience in agribusiness for participants was 2.13 years and 1.95 years for non-participants. Even though the result showed that participants had more years of agribusiness experience compared to the non-participants, an average of 2 years is still considered to be very little. This, therefore, implies that both groups had very little experience in agribusiness. The difference between the two groups was statistically significant at 10 per cent.

Also, only 7 per cent of the participants were formally employed against 10 per cent of the non-participants. The difference between the two groups was significant at 10 per cent. Majority of the participants (62.20 per cent) had their own agribusiness enterprise against only 34.67 per cent among the non-participants. This high percentage among the participants may likely be as a result of their participation in the training program. The difference between the two groups was significant at 1 per cent.

Data collected also showed that 25.67 per cent and 20.44 per cent of the participants and non-participants respectively had access to credit. The difference was significant at 1 per cent. In terms of ownership of productive assets, on the average, participants had a higher index score of 4.68 compared to non-participants at 4.35. The difference was statistically significant at 5 per cent.

5.2 Determinants of Youth Participation in the Training Program

This section presents discussion on the estimated coefficients from the selection equation. These estimates are presented in Table 3. The factors influencing youth participation in the training program are consistent with existing findings (Ayanwuyi, Akinboye, & Olaniyi, 2013; Latopa, Abdul-Rashid, Samah, & Abdullah, 2015; Ayinde, Olarewaju, & Aribifo, 2016; Sudarshanie, 2015; Muathe, 2016). In line with the findings of Ayanwuyi, et al. (2013), age had a positive and significant influence on program participation. This could be attributed to the increased consciousness of the importance of agriculture as people grow older (experience).

Table 3. Results of the endogenous switching probit model

Variable	Selection/Participation Equation		Outcome/Agribusiness Engagement Equation			
	Coefficient	S.E	Regime 1: Engaged		Regime 2: Not Engaged	
			Coefficient	S.E	Coefficient	S.E
AGE	0.111***	0.011	0.033	0.028	0.005	0.021
EDUC	0.045***	0.015	-0.048**	0.022	0.012	0.022
GENDER	-0.140	0.099	0.242*	0.135	0.554***	0.136
HHSIZE	-0.015	0.015	-0.016	0.025	0.029*	0.017
MIGR_STAT	0.293***	0.100	-0.231	0.145	-0.042	0.130
ASTINDEX	-0.020	0.027	0.188***	0.047	-0.079**	0.038
TRAIN_PERC	0.986***	0.147				
EMP_TYPE	-0.604***	0.166	-0.299	0.265	-0.149	0.248
JOB_SEARCH	0.026	0.099	-0.026	0.141	0.411*	0.135
MHI	0.645***	0.067	-0.289**	0.116	0.342***	0.109
CREDIT	-0.158	0.107	0.586***	0.170	0.290**	0.135
Constant	-6.293***	0.479	1.404	1.211	-2.783***	0.810
Rho			-0.487***	0.225	-0.556***	0.207
Wald chi2(2) = 6.91 Prob > chi2 = 0.03						

Note. $p > 0.1 = *$, $p > 0.05 = **$, $p > 0.01 = ***$, S.E. = Standard Error.

Source: Author's Computation, 2019.

Also, the positive and significant influence of years of formal education on participation was not expected but, could be attributed to the uncondusive struggle for white-collar jobs after graduation which has driven many young graduates to look for alternative employment (particularly in the agricultural sector) outside their professional career. Furthermore, being formally employed reduced youths' likelihood of participating in the program. This could likely be as a result of the inflexibility of formal employment as compared to informal ones. Thus, those who are formally employed may not have the luxury of time to attend training programs.

5.3 Impact Estimates

The estimates of the endogenous switching probit regression model are presented in Tables 2 and 3. The Wald tests confirm the joint significance of the error correlation coefficients in the outcome and selection equations (Table 3). Thus, the null hypothesis that $\rho_1 = \rho_0$ cannot be rejected suggesting that the unobservable in the selection equation are correlated with the unobservable in the outcome equation. Also, the estimated rho coefficient shows that a negative correlation exist between the unobserved characteristics which predicts selection into the training program and agribusiness engagement outcome among the youths. In other words, the unobservable which predicts a lower propensity for participation also predicts lower engagement in agribusiness. This justifies the use of the endogenous switching probit model for the analysis.

Table 4 presents the estimated ATE and ATT based on the endogenous switching probit estimates for each engagement choice and selection type. The obtained ATE value of 0.454 shows that a randomly selected youth would have approximately 45 percent higher probability of engaging in agribusiness if he/she had participated in the training program. The positive sign and high significance of the ATE implies that program participation would have a significant additional effect on a youth's decision to engage in agribusiness. Also, the estimated ATT of 0.534 suggests a 53 percent higher likelihood of engaging in agribusiness for participants. Thus, treatment assignment typically increased the probability of engaging in agribusiness by 53 percent.

Table 4. Treatment effect

	Estimate	S.E
Average Treatment Effect (ATE)	0.454***	0.234
Average Treatment Effect on the Treated (ATT)	0.534***	0.236

Note. $p > 0.1 = *$, $p > 0.05 = **$, $p > 0.01 = ***$, S.E. = Standard Error.

Source: Author's Computation, 2019.

The ATT effect is larger than the ATE suggesting that participants are more likely to engage in agribusiness as a result of training received than would be the case among youths selected from the sample randomly. This further suggests that participation in the training had a positive and significant impact of the decision to engage in agribusiness.

6. Conclusion and Policy Recommendation

The main research question investigated in this paper is whether participation in agricultural programs has an impact on youth decision to engage in agribusiness. The result indicated that decision to participate in the training program was positively influenced by age, years of schooling, migration status and, perception about training programs while it was negatively influenced by type of employment.

With regards to the major research question, the findings imply that on the average, participation in the program increased youths' likelihood to engage in agribusiness. This suggests that training initiatives aim at promoting youth engagement in agribusiness should be strongly encouraged. From a policy intervention point of view, policy makers and other development partners have to take note of the various factors which favors or hinders youth engagement in agribusiness as well as take more advantage of training as a means of increasing youth engagement in agribusiness.

While it is true that training had a positive impact on engagement decision, a valid policy challenge which could arise would be how to attract a large number of young people to participate in the training. On this note, there is a need to work on how young people perceive agriculture. This could be by introducing interesting programs and strategies which can make agriculture cool and more attractive to young people.

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